

Question 1

With the use of unshielded twisted-pair copper wire in a network, what causes crosstalk within the cable pairs?

- **the magnetic field around the adjacent pairs of wire**
- the use of braided wire to shield the adjacent wire pairs
- the reflection of the electrical wave back from the far end of the cable
- the collision caused by two nodes trying to use the media simultaneously

Explanation: Crosstalk is a type of noise, or interference that occurs when signal transmission on one wire interferes with another wire. When current flows through a wire a magnetic field is produced. The produced magnetic field will interface the signal carried in the adjacent wire.

Question 2

Refer to the graphic. What type of cabling is shown?



- STP
- UTP
- coax
- **fiber**

Explanation: Network cabling include different types of cables:

- UTP cable consists of four pairs of color-coded wires that have been twisted together and then encased in a flexible plastic sheath.
- STP cable uses four pairs of wires, each wrapped in a foil shield, which are then wrapped in an overall metallic braid or foil.

- Coaxial cable uses a copper conductor and a layer of flexible plastic insulation surrounds the copper conductor.
- Fiber cable is a flexible, extremely thin, transparent strand of glass surrounded by plastic insulation.

Question 3

In addition to the cable length, what two factors could interfere with the communication carried over UTP cables? (Choose two.)

- **crosstalk**
- bandwidth
- size of the network
- signal modulation technique
- **electromagnetic interference**

Explanation: Copper media is widely used in network communications. However, copper media is limited by distance and signal interference. Data is transmitted on copper cables as electrical pulses. The electrical pulses are susceptible to interference from two sources:

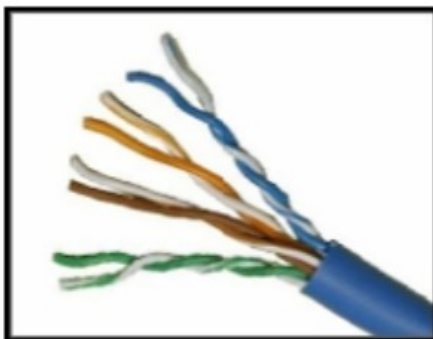
Electromagnetic interference (EMI) or radio frequency interference (RFI) – EMI and RFI signals can distort and corrupt the data signals being carried by copper media.

Crosstalk – Crosstalk is a disturbance caused by the electric or magnetic fields of a signal on one wire interfering with the signal in an adjacent wire.

Question 4

Case 2:

Refer to the graphic. What type of cabling is shown?



- STP
- **UTP**
- coax

- fiber

Question 5

Which two devices commonly affect wireless networks? (Choose two.)

- Blu-ray players
- home theaters
- **cordless phones**
- **microwaves**
- incandescent light bulbs
- external hard drives

Explanation: Radio Frequency Interference (RFI) is the interference that is caused by radio transmitters and other devices that are transmitting in the same frequency.

Question 6

What are two characteristics of fiber-optic cable? (Choose two.)

- **It is not affected by EMI or RFI.**
- Each pair of cables is wrapped in metallic foil.
- It combines the technique of cancellation, shielding, and twisting to protect data.
- It typically contains 4 pairs of fiber-optic wires.
- **It is more expensive than UTP cabling is.**

Explain: Fiber-optic cabling supports higher bandwidth than UTP for longer distances. Fiber is immune to EMI and RFI, but costs more, requires more skill to install, and requires more safety precautions.

Question 7

Which two fields or features does Ethernet examine to determine if a received frame is passed to the data link layer or discarded by the NIC? (Choose two.)

- auto-MDIX

- CEF
- **Frame Check Sequence**
- **minimum frame size**
- source MAC address

Explanation: An Ethernet frame is not processed and is discarded if it is smaller than the minimum (64 bytes) or if the calculated frame check sequence (FCS) value does not match the received FCS value. Auto-MDIX (automatic medium-dependent interface crossover) is Layer 1 technology that detects cable straight-through or crossover types. The source MAC address is not used to determine how the frame is received. CEF (Cisco Express Forwarding) is a technology used to expedite Layer 3 switching.

Question 8

What are three ways that media access control is used in networking?
(Choose three.)

- **Ethernet utilizes CSMA/CD.**
- **Media access control provides placement of data frames onto the media.**
- Contention-based access is also known as deterministic.
- 802.11 utilizes CSMA/CD.
- **Data link layer protocols define the rules for access to different media.**
- Networks with controlled access have reduced performance due to data collisions.

Explanation: Wired Ethernet networks use CSMA/CD for media access control. IEEE 802.11 wireless networks use CSMA/CA, a similar method. Media access control defines the way data frames get placed on the media. The controlled access method is deterministic, not a contention-based access to networks. Because each device has its own time to use the medium, controlled access networks such as legacy Token Ring do not have collisions.

Question 9

Which statement is true about the CSMA/CD access method that is used in Ethernet?

- When a device hears a carrier signal and transmits, a collision cannot occur.
- **All network devices must listen before transmitting.**
- A jamming signal causes only devices that caused the collision to execute a backoff algorithm.
- Devices involved in a collision get priority to transmit after the backoff period.

Explanation: Legacy bus-topology Ethernet LAN uses CSMA/CD as network media access control protocol. It works by detecting a collision in the medium and backing off (after transmitting a jam signal) as necessary. When one host wants to transmit a frame, it listens on the medium to check if the medium is busy. After it senses that no one else is transmitting, the host starts transmitting the frame, it also monitors the current level to detect a collision. If it detects a collision, it transmits a special jam signal so that all other hosts can know there was a collision. The other host will receive this jam signal and stop transmitting. After this, both hosts enter an exponential backoff phase and retry transmission.

Question 10

A network team is comparing physical WAN topologies for connecting remote sites to a headquarters building. Which topology provides high availability and connects some, but not all, remote sites?

- mesh
- **partial mesh**
- hub and spoke
- point-to-point

Explanation: Partial mesh topologies provide high availability by interconnecting multiple remote sites, but do not require a connection between all remote sites. A mesh topology requires point-to-point links with every system being connected to every other system. A point-to-point topology is where each device is connected to one other device. A hub and spoke uses a central device in a star topology that connects to other point-to-point devices.

Question 11

What is contained in the trailer of a data-link frame?

- logical address

- physical address
- data
- **error detection**

Explanation: The trailer in a data-link frame contains error detection information that is pertinent to the frame included in the FCS field. The header contains control information, such as the addressing, while the area that is indicated by the word “data” includes the data, transport layer PDU, and the IP header.

Question 12

Which statement describes a characteristic of the frame header fields of the data link layer?

- They all include the flow control and logical connection fields.
- Ethernet frame header fields contain Layer 3 source and destination addresses.
- **They vary depending on protocols.**
- They include information on user applications.

Explanation: All data link layer protocols encapsulate the Layer 3 PDU within the data field of the frame. However, the structure of the frame and the fields that are contained in the header vary according to the protocol. Different data link layer protocols may use different fields, like priority/quality of service, logical connection control, physical link control, flow control, and congestion control.

Question 13

During the encapsulation process, what occurs at the data link layer for a PC connected to an Ethernet network?

- An IP address is added.
- The logical address is added.
- **The physical address is added.**
- The process port number is added.

Explanation: The Ethernet frame includes the source and destination physical address. The trailer includes a CRC value in the Frame Check Sequence field to allow the receiving device to determine if the frame has been changed (has errors) during the transmission.

Question 14

What is a characteristic of the LLC sublayer?

- It provides the logical addressing required that identifies the device.
- It provides delimitation of data according to the physical signaling requirements of the medium.
- **It places information in the frame allowing multiple Layer 3 protocols to use the same network interface and media.**
- It defines software processes that provide services to the physical layer.

Explanation: The Logical Link Control (LLC) defines the software processes that provide services to the network layer protocols. The information is placed by LLC in the frame and identifies which network layer protocol is being used for the frame. This information allows multiple Layer 3 protocols, such as IPv4 and IPv6, to utilize the same network interface and media.

Question 15

Which statement describes an extended star topology?

- **End devices connect to a central intermediate device, which in turn connects to other central intermediate devices.**
- End devices are connected together by a bus and each bus connects to a central intermediate device.
- Each end system is connected to its respective neighbor via an intermediate device.
- All end and intermediate devices are connected in a chain to each other.

Explanation: In an extended star topology, central intermediate devices interconnect other star topologies.

Question 16

A network administrator is connecting two modern switches using a straight-through cable. The switches are new and have never been configured. Which three statements are correct about the final result of the connection? (Choose three.)

- **The link between the switches will work at the fastest speed that is supported by both switches.**

- **The link between switches will work as full-duplex.**
- If both switches support different speeds, they will each work at their own fastest speed.
- **The auto-MDIX feature will configure the interfaces eliminating the need for a crossover cable.**
- The connection will not be possible unless the administrator changes the cable to a crossover cable.
- The duplex capability has to be manually configured because it cannot be negotiated.

Explanation: Modern switches can negotiate to work in full-duplex mode if both switches are capable. They will negotiate to work using the fastest possible speed and the auto-MDIX feature is enabled by default, so a cable change is not needed.

Question 17

What are two examples of the cut-through switching method? (Choose two.)

- store-and-forward switching
- **fast-forward switching**
- CRC switching
- **fragment-free switching**
- QOS switching

Explain: Store-and forward switching accepts the entire frame and performs error checking using CRC before forwarding the frame. Store-and-forward is often required for QOS analysis. Fast-forward and fragment-free are both variations of the cut-through switching method where only part of the frame is received before the switch begins to forward it.

Question 18

What is one advantage of using the cut-through switching method instead of the store-and-forward switching method?

- has a positive impact on bandwidth by dropping most of the invalid frames
- makes a fast forwarding decision based on the source MAC address of the frame

- **has a lower latency appropriate for high-performance computing applications**
- provides the flexibility to support any mix of Ethernet speeds

Explanation: Cut-through switching provides lower latency switching for high-performance computing (HPC) applications. Cut-through switching allows more invalid frames to cross the network than store-and-forward switching. The cut-through switching method can make a forwarding decision as soon as it looks up the destination MAC address of the frame.

Question 19

What is the purpose of the FCS field in a frame?

- to obtain the MAC address of the sending node
- to verify the logical address of the sending node
- to compute the CRC header for the data field
- to determine if errors occurred in the transmission and reception

Explanation: The FCS field in a frame is used to detect any errors in the transmission and receipt of a frame. This is done by comparing the CRC value within the frame against a computed CRC value of the frame. If the two values do not match, then the frame is discarded.

Question 20

Which frame forwarding method receives the entire frame and performs a CRC check to detect errors before forwarding the frame?

- cut-through switching
- **store-and-forward switching**
- fragment-free switching
- fast-forward switching

Explanation: Fast-forward and fragment-free switching are variations of cut-through switching, which begins to forward the frame before the entire frame is received.

Question 21

Which advantage does the store-and-forward switching method have compared with the cut-through switching method?

- collision detecting

- **frame error checking**
- faster frame forwarding
- frame forwarding using IPv4 Layer 3 and 4 information

Explanation: A switch using the store-and-forward switching method performs an error check on an incoming frame by comparing the FCS value against its own FCS calculations after the entire frame is received. In comparison, a switch using the cut-through switching method makes quick forwarding decisions and starts the forwarding process without waiting for the entire frame to be received. Thus a switch using cut-through switching may send invalid frames to the network. The performance of store-and-forward switching is slower compared to cut-through switching performance. Collision detection is monitored by the sending device. Store-and-forward switching does not use IPv4 Layer 3 and 4 information for its forwarding decisions.

Question 22

What is the auto-MDIX feature?

- **It enables a device to automatically configure an interface to use a straight-through or a crossover cable.**
- It enables a device to automatically configure the duplex settings of a segment.
- It enables a device to automatically configure the speed of its interface.
- It enables a switch to dynamically select the forwarding method.

Question 23

Which is a multicast MAC address?

- FF-FF-FF-FF-FF-FF
- 5C-26-0A-4B-19-3E
- **01-00-5E-00-00-03**
- 00-26-0F-4B-00-3E

Explanation: Multicast MAC addresses begin with the special value of 01-00-5E.

Question 24

What are two actions performed by a Cisco switch? (Choose two.)

- building a routing table that is based on the first IP address in the frame header
- **using the source MAC addresses of frames to build and maintain a MAC address table**
- forwarding frames with unknown destination IP addresses to the default gateway
- **utilizing the MAC address table to forward frames via the destination MAC address**
- examining the destination MAC address to add new entries to the MAC address table

Explanation: Important actions that a switch performs are as follows:

- When a frame comes in, the switch examines the Layer 2 source address to build and maintain the Layer 2 MAC address table.
- It examines the Layer 2 destination address to determine how to forward the frame. When the destination address is in the MAC address table, then the frame is sent out a particular port. When the address is unknown, the frame is sent to all ports that have devices connected to that network.

Question 25

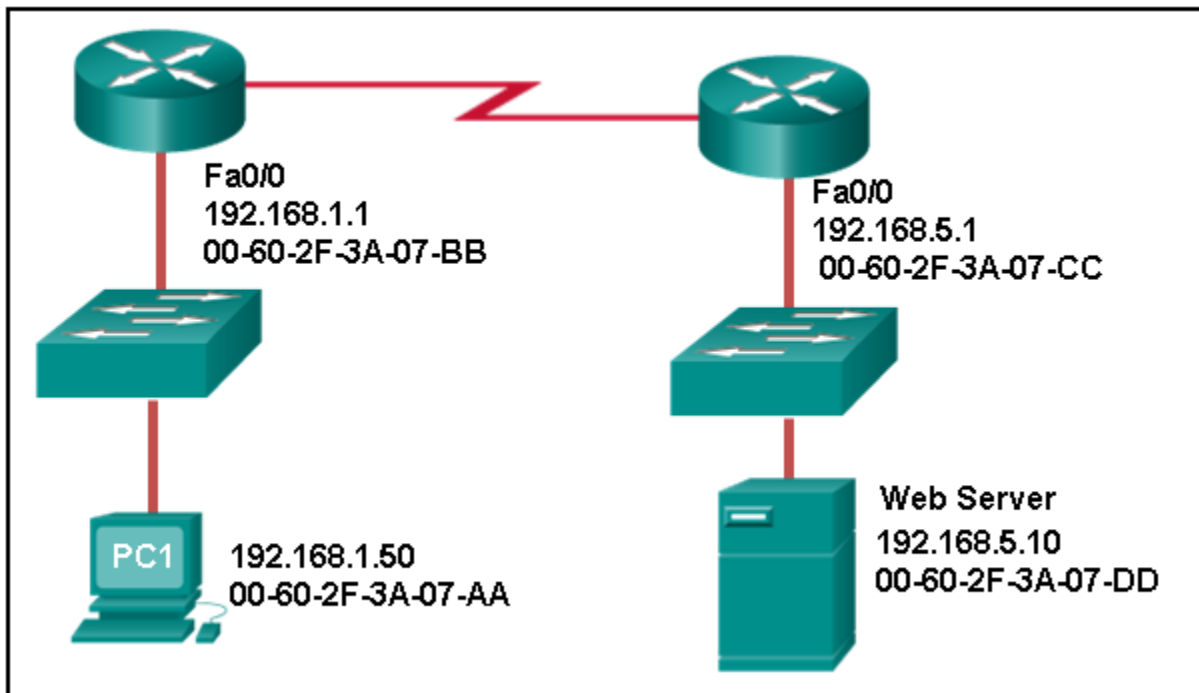
Which switching method uses the CRC value in a frame?

- cut-through
- fast-forward
- fragment-free
- **store-and-forward**

Explanation: When the store-and-forward switching method is used, the switch receives the complete frame before forwarding it on to the destination. The cyclic redundancy check (CRC) part of the trailer is used to determine if the frame has been modified during transit. In contrast, a cut-through switch forwards the frame once the destination Layer 2 address is read. Two types of cut-through switching methods are fast-forward and fragment-free.

Question 26

Refer to the exhibit. What is the destination MAC address of the Ethernet frame as it leaves the web server if the final destination is PC1?



- 00-60-2F-3A-07-AA
- 00-60-2F-3A-07-BB
- **00-60-2F-3A-07-CC**
- 00-60-2F-3A-07-DD

Explanation: The destination MAC address is used for local delivery of Ethernet frames. The MAC (Layer 2) address changes at each network segment along the path. As the frame leaves the web server, it will be delivered by using the MAC address of the default gateway.

Question 27

Refer to the exhibit. The PC is connected to the console port of the switch. All the other connections are made through FastEthernet links. Which types of UTP cables can be used to connect the devices?

- 1 - rollover, 2 - crossover, 3 - straight-through
- **1 - rollover, 2 - straight-through, 3 - crossover**
- 1 - crossover, 2 - straight-through, 3 - rollover
- 1 - crossover, 2 - rollover, 3 - straight-through

Explanation: A straight-through cable is commonly used to interconnect a host to a switch and a switch to a router. A crossover cable is used to interconnect similar devices together like switch to a switch, a host to a host, or a router to a router. If a switch has the MDIX capability, a crossover could be used to connect the switch to the router; however, that option is not available. A rollover cable is used to connect to a router or switch console port.

Question 28

Open the PT Activity. Perform the tasks in the activity instructions and then answer the question.

Which port does Switch0 use to send frames to the host with the IPv4 address 10.1.1.5?

- Fa0/5
- Fa0/9
- Fa0/1
- **Fa0/11**

Explanation: Issuing the command `ipconfig /all` from the PC0 command prompt displays the IPv4 address and MAC address. When the IPv4 address 10.1.1.5 is pinged from PC0, the switch stores the source MAC address (from PC0) along with the port to which PC0 is connected. When the destination reply is received, the switch takes the destination MAC address and compares to MAC addresses stored in the MAC address table. Issuing the `show mac-address-table` on the PC0 Terminal application displays two dynamic MAC address entries. The MAC address and port entry that does not belong to PC0 must be the MAC address and port of the destination with the IPv4 address 10.1.1.5.

Question 29

What makes fiber preferable to copper cabling for interconnecting buildings? (Choose three.)

- **greater distances per cable run**
- lower installation cost
- **limited susceptibility to EMI/RFI**
- durable connections

- **greater bandwidth potential**
- easily terminated

Explanation: Optical fiber cable transmits data over longer distances and at higher bandwidths than any other networking media. Unlike copper wires, fiber-optic cable can transmit signals with less attenuation and is completely immune to EMI and RFI.

Question 30

What does the term “attenuation” mean in data communication?

- **loss of signal strength as distance increases**
- time for a signal to reach its destination
- leakage of signals from one cable pair to another
- strengthening of a signal by a networking device

Explanation: Data is transmitted on copper cables as electrical pulses. A detector in the network interface of a destination device must receive a signal that can be successfully decoded to match the signal sent. However, the farther the signal travels, the more it deteriorates. This is referred to as signal attenuation.

Question 31

Refer to the exhibit. What is wrong with the displayed termination?

- The woven copper braid should not have been removed.
- The wrong type of connector is being used.
- **The untwisted length of each wire is too long.**
- The wires are too thick for the connector that is used.

Explanation: When a cable to an RJ-45 connector is terminated, it is important to ensure that the untwisted wires are not too long and that the flexible plastic sheath surrounding the wires is crimped down and not the bare wires. None of the colored wires should be visible from the bottom of the jack.

Question 32

What OSI physical layer term describes the capacity at which a medium can carry data?

bandwidth

throughput

latency

goodput

Question 33

Which two functions are performed at the MAC sublayer of the OSI data link layer? (Choose two.)

- Adds Layer 2 control information to network protocol data.
- Places information in the frame that identifies which network layer protocol is being used for the frame.
- **Controls the NIC responsible for sending and receiving data on the physical medium.**
- **Implements a trailer to detect transmission errors.**
- Enables IPv4 and IPv6 to utilize the same network interface and media.

Case 2:

- **Provides synchronization between source and target nodes.**
- **Integrates various physical technologies.**
- Communicates between the networking software at the upper layers and the device hardware at the lower layers.
- Adds Layer 2 control information to network protocol data.
- Enables IPv4 and IPv6 to utilize the same network interface and media.

Case 3:

- Enables IPv4 and IPv6 to utilize the same network interface and media.
- **Provides synchronization between source and target nodes.**
- **Implements a trailer to detect transmission errors.**
- Adds Layer 2 control information to network protocol data.
- Places information in the frame that identifies which network layer protocol is being used for the frame.

Case 4:

- Enables IPv4 and IPv6 to utilize the same network interface and media.
- Adds Layer 2 control information to network protocol data.
- **Integrates various physical technologies.**
- Communicates between the networking software at the upper layers and the device hardware at the lower layers.
- **Provides synchronization between source and target nodes.**

Case 5:

- Places information in the frame that identifies which network layer protocol is being used for the frame.
- **Integrates various physical technologies.**
- Adds Layer 2 control information to network protocol data.
- **Controls the NIC responsible for sending and receiving data on the physical medium.**
- Communicates between the networking software at the upper layers and the device hardware at the lower layers.

Case 6:

- **Controls the NIC responsible for sending and receiving data on the physical medium**
- **Provides a mechanism to allow multiple devices to communicate over a shared medium.**

Question 34

What action will occur if a host receives a frame with a destination MAC address of FF:FF:FF:FF:FF:FF?

- **The host will process the frame.**
- The host returns the frame to the switch.
- The host replies to the switch with its own IP address.
- The host forwards the frame to all other hosts.

